

**SCIENCE, AERONAUTICS AND TECHNOLOGY**

**FISCAL YEAR 2003 ESTIMATES**

**BUDGET SUMMARY**

**ACADEMIC PROGRAMS**

**MINORITY UNIVERSITY RESEARCH AND EDUCATION PROGRAM**

**SUMMARY OF RESOURCES REQUIREMENTS**

	FY 2001 OP PLAN <u>REVISED</u>	FY 2002 INITIAL <u>OP PLAN</u>	FY 2003 PRES <u>BUDGET</u>
	<u>(Millions of Dollars)</u>		
<u>Historically Black Colleges and Universities</u>	<u>31.1</u>	<u>49.0</u>	<u>49.7</u>
Institutional Science, Engineering and Technology Awards	2.8	16.5	17.9
Principal Investigator Awards	2.7	5.2	5.7
Partnership Awards	10.9	12.9	11.2
Math and Science Education Awards	14.7	14.4	14.9
Enterprise Program Funding *	[20.9]		
 <u>Other Minority Universities</u>	 <u>24.8</u>	 <u>35.7</u>	 <u>32.4</u>
Institutional Science, Engineering and Technology Awards	3.2	12.6	13.2
Principal Investigator Awards	2.3	2.3	2.8
Partnership Awards	5.2	3.6	2.2
Math and Science Education Awards **	14.1	17.2	14.2
Enterprise Program Funding *	[15.3]		
 Total Minority University Research Programs	 <u>55.9</u>	 <u>84.7</u>	 <u>82.1</u>
Enterprise Program Funding *	[36.2]		
<b>Total Program Funding to Minority University Research</b>	<b><u>92.1</u></b>	<b><u>84.7</u></b>	<b><u>82.1</u></b>

\* Includes \$36.2M encumbered funds transferred from Enterprise Budgets for FY 2002

\*\* Includes \$2.6M in Congressional Earmarks for FY 2002

## SCIENCE, AERONAUTICS AND TECHNOLOGY

### FISCAL YEAR 2003 ESTIMATES

#### BUDGET SUMMARY

##### ACADEMIC PROGRAMS

##### MINORITY UNIVERSITY RESEARCH AND EDUCATION PROGRAM

	<u>FY 2001</u>	<u>FY 2002</u>	<u>FY 2003</u>
<u>Distribution of Program Amount by Installation</u>	<u>(Millions of Dollars)</u>		
Ames Research Center (ARC)	1.71	1.8	2.0
Dryden Flight Research Center (DFRC)	1.0	1.3	1.1
Glenn Research Center (GRC)	8.0	5.7	7.7
Goddard Space Flight Center (GSFC)	27.6	61.6	52.5
Jet Propulsion Laboratory (JPL)	0.9	0.3	0.2
Johnson Space Center (JSC)	2.3	1.2	3.6
Kennedy Space Center (KSC)	2.7	2.0	2.3
Langley Research Center (LaRC)	2.5	3.1	1.7
Marshall Space Flight Center (MSFC)	6.5	5.1	7.7
Stennis Space Center (SSC)	0.9	0.5	0.9
Headquarters (HQ)	<u>1.8</u>	<u>2.1</u>	<u>2.4</u>
<b>Total</b>	<b><u>55.9</u></b>	<b><u>84.7</u></b>	<b><u>82.1</u></b>

##### PROGRAM GOALS

The Minority University Research and Education Programs (MUREP) foci are expanding and advancing NASA's scientific and technological base through collaborative efforts with Historically Black Colleges and Universities (HBCU) and Other Minority Universities (OMU) - especially Hispanic-Serving Institutions (HSI) and Tribal Colleges and Universities (TCU) - all hereafter referred to as Minority Institutions (MI). NASA's outreach to MI's in FY 2003 will build upon the prior years' investments in MI research and academic infrastructure; development of the science, engineering and technology pipeline; and promotion of educational excellence at all levels. Through sufficient infrastructure-building support, exposure to NASA's unique mission and facilities, and involvement in competitive peer review and merit selection processes, MI's will develop significant contributions to the Agency's strategic goals. In addition to the Federal mandates for MI's, there are strategic goals that guide NASA's MUREP: (1) foster research and development activities at MI's which contribute substantially to NASA's mission; (2) create systemic and sustainable change at MI's through partnerships and programs that enhance research and educational outcomes in NASA-related fields; (3) prepare faculty

and students at MI's to successfully participate in the conventional, competitive research and education process; and (4) increase the number of students served by MI's who enter college and successfully pursue and complete degrees in NASA-related fields. The MUREP are implemented through awards in four categories: (1) Institutional Science Engineering and Technology, (2) Principal Investigator, (3) Partnership, and (4) Mathematics and Science.

### **Institutional Science, Engineering and Technology (ISET) Awards**

	<u>FY 2001</u>	<u>FY 2002</u>	<u>FY 2003</u>
		(Millions of Dollars)	
Historically Black Colleges and Universities (HBCU)	2.8	16.5	17.9
Other Minority Universities (OMU)	<u>3.2</u>	<u>12.6</u>	<u>13.2</u>
ISET Research Program Total	<u>6.0</u>	<u>29.1</u>	<u>31.1</u>

#### **Goals**

1. Achieve a broad-based, competitive aerospace research capability among the Nation's Minority Institutions (MI);
2. Foster new aerospace science and technology concepts;
3. Expand the Nation's base for aerospace research and development;
4. Develop mechanisms for increased participation by faculty and students in mainstream research; and
5. Increase the productivity of students (who are U.S. citizens and who have historically been underrepresented) with advanced degrees in NASA-related fields.

#### **Content**

ISET includes the University Research Center Program (URC) and the Institutional Research Awards (IRA). The URC Awards are collaborative programs conducted in cooperation with each Strategic Enterprise. These awards are designed to achieve a broad-based, competitive aerospace research capability among the nation's MI's that will: foster new aerospace science and technology concepts; expand the Nation's base for aerospace research and development; develop mechanisms for increased participation by faculty and students in mainstream research; and increase the productivity of underrepresented students with advanced degrees in NASA-related fields. The URC's have formed the National Alliance of NASA University Research Centers (NANURC) and the National Conference of the University Research Centers in order to enhance collaborations and explore avenues for increasing the number of advanced degrees being awarded to disadvantaged students.

Institutional Research Awards (IRA) improves academic, scientific and technology infrastructure and broadens the NASA-related science and technology base at MI's. The Enterprise NASA Research Announcement (NRA) for Research Opportunities in Space Science (ROSS) solicits proposals for basic investigations that seek to understand natural space phenomena across the full range of space science programs relevant to the four OSS science themes.

#### **Major ISET Research Results in the Past Year**

- Completed annual renewal for continuation of 14 competitively selected URC under Group I and Group II designation.
- Procured third-party assessment of the Group I URC's that recommend extension of successful initiatives at HBCU's.

**Program Plans for FY 2003**

- Continue funding 10 new University Research Centers started in FY02 as a result of the competitively selected institutions designated as Group III URC.
- Provide technical assistance to ensure development of Minority Institutions so that there is clear progress towards development of competitive capacity

**Principal Investigator (PI) Program**

	<u>FY 2001</u>	<u>FY 2002</u>	<u>FY 2003</u>
		(Millions of Dollars)	
Historically Black Colleges and Universities (HBCU)	2.7	5.2	5.7
Other Minority Universities (OMU)	<u>2.3</u>	<u>2.3</u>	<u>2.8</u>
Principal Investigator Program Totals	<u>5.0</u>	<u>7.5</u>	<u>8.5</u>

**Goal**

Increase the participation of faculty and other professionals in conducting NASA research, research training and/or administration.

**Content**

The Faculty Awards for Research (FAR) provide faculty at MI's the opportunity to integrate the research and education components of their careers with the unique mission requirements of a specific NASA Center/JPL. The FAR program provides merit selection of proposals from tenured and tenure-track faculty to provide research support to enable them to demonstrate creativity, productivity, and future promise in the transition to achieving competitive awards in the Agency's mainstream research processes. FAR is implemented through a competitive peer review and merit selection process in collaboration with the NASA Centers/JPL.

The NASA Administrator's Fellowship Program (NAFP) provides opportunities for NASA career employees and the mathematics, science, engineering, and technology (MSET) faculty of minority-serving institutions to compete through peer review for placement in a formal professional development program. In addition to individualized professional development enhancement, NASA employees spend a year teaching or conducting research at a minority-serving institution while MSET faculty spends a year conducting research at a NASA Center.

The Louis Stokes Professional Leadership Program provides competitive, peer review selection of faculty, educators and other scientific and technical personnel with an opportunity to participate in a 4-year professional leadership program designed to assist the HBCU's and OMU's in strengthening the delivery and management of NASA-sponsored scientific research, and MSET educational/training programs. Participants will spend 2 years at a NASA Center/JPL and 2 years at an HBCU or OMU enhancing their knowledge and ability to lead the institutions in better responses to the Federal Financial Assistance Management Improvement Act, Electronic Grants Initiatives, the Government Performance and Results Act, and achievement of better performance outcomes in conducting NASA-funded research and education programs.

### **Major PI Program Results in the Past Year**

- NRA issued for FY 01 Faculty Awards for Research added a provision for planning grants to enable early career professionals an opportunity to visit NASA Installations and develop their research plans for the next NRA.
- NAFP hosted the 2001 NAFP Symposium that included professional development workshops and a reunion. Since its 1997 inception, NAFP has selected 39 fellows. Thirty-one fellows attended the Symposium, sharing research, education, and professional growth. 2001 Cohort included four NASA employees and six MSET faculty from Minority Institutions.
- Through an extensive search and peer review process, 12 faculty and administrators were identified to served in the initial Cohort of Louis Stokes Fellows. Former Congressman Stokes was present to receive and address the fellows.

### **Program Plans for FY 2003**

- Issue new solicitation for individual investigator research awards to meet the research agenda of NASA field installations.
- Develop a new solicitation for Phase II FAR awards to provide a pathway to building the human resources capability at MI's.
- Issue new calls within NASA and MI for Engineers, Scientists, and Technologists participants for the NAFP.
- Develop a new announcement for Cohort 2 of the Louis Stokes Professional Leadership Program that will assist the HBCU's and OMU's in strengthening the delivery and management of NASA-sponsored scientific research and education.

### **Partnership Program**

	<u>FY 2001</u>	<u>FY 2002</u>	<u>FY 2003</u>
		(Millions of Dollars)	
Historically Black Colleges and Universities (HBCU)	10.9	12.9	11.2
Other Minority Universities (OMU)	<u>5.2</u>	<u>3.6</u>	<u>2.2</u>
Partnership Program Totals	<u>16.1</u>	<u>16.5</u>	<u>13.4</u>

### **Goal**

To enhance academic infrastructure in specific NASA-related disciplines with a focus on interdisciplinary collaborations.

### **Content**

Partnership Awards for the Integration of Research into MSET Undergraduate Education (PAIR) has an interdisciplinary focus that spans more than one MSET academic program, creating a collaborative effort among different academic departments. The enhanced collaboration among MSET academic departments strengthens the MSET baccalaureate degree-producing capacity of the MI's by building upon previous NASA funding. As a result, the outcomes of partnership awards are: (1) innovative interdisciplinary study among MSET academic programs that center on NASA-related course study, research, and technological applications, including collaborative efforts within MSET academic departments; (2) more competitive undergraduate U.S. students, underrepresented in MSET fields who, because of their research training and exposure to cutting-edge technologies, are better prepared to enter MSET graduate programs or MSET employment; (3) enhanced undergraduate courses and curricula including laboratory-based curricula that foster collaborative educational experiences between faculty members and students leading to institutional faculty development efforts; and (4) model HBCU's and OMU's that integrate NASA-related research into the appropriate areas of the undergraduate curriculum and expose more of the academic community to the Agency's cutting-edge technologies.

### **Major Partnership Results in the Past Year**

- Established a partnership with the National Association for Equal Opportunity in Higher Education (NAFEO) to establish an Academy for Scientific Research and Educational Advancement in the NASA Ames Research Center Research Park to: 1) expand research collaborations between NASA and Research Park scientists both on-site and at the partnering institutions, especially in the areas of astrobiology/biotechnology, information technology and nanotechnology; 2) contribute with innovative novel projects designed to examine the new frontiers in space research; 3) focus on integrating faculty and students to current NASA projects and in encouraging them to pursue careers in fields related to NASA interests; and 4)



establish a virtual community of faculty and students at HBCU's and OMU's dedicated to supporting NASA's scientific mission including a diverse scientific workforce.

**Program Plans for FY 2003**

- Continuation funding decisions for the multi-year awards selected under prior year NRA's.
- New NRA for Partnership Awards for the Integration of Research (PAIR) into MSET Undergraduate Education

### **Mathematics and Science Education (MSE) Awards**

	<u>FY 2001</u>	<u>FY 2002</u>	<u>FY 2003</u>
		(Millions of Dollars)	
Historically Black Colleges and Universities (HBCU)	14.7	14.4	14.9
Other Minority Universities (OMU)	<u>14.1</u>	<u>17.2</u>	<u>14.2</u>
Mathematics & Science Education Program Totals	<u>28.8</u>	<u>31.6</u>	<u>29.1</u>

### **Goals**

1. Increase the participation and achievement of socially and economically disadvantaged and/or disabled students in MSET fields at all levels of education.
2. Contribute to the national education goals by integrating the contents from the NASA mission into the educational outreach projects at MI's.
3. Contributes to the increase in the number and the strengthening of the skills, knowledge, and interest of students and teachers in mathematics-, science-, engineering-, and technology-based academic programs.

### **Content**

Undergraduate and Graduate Awards provide scholarships, fellowships, internships, and research opportunities in NASA-related fields, and other services to enhance retention and increase graduation rates. These awards contribute to the U.S. scientific and technical leadership by partnering with HBCU's and OMU's to meet the Agency's mission and human resource requirements. These awards encourage students to pursue scholarships in science, mathematics, engineering and technology through research-based academic programs. The ultimate result of such participation is an increased number of individuals from underrepresented groups in the nation's pool of graduate researchers.

Teacher Preparation and Enhancement Awards provide opportunities for MI's to develop diverse and exemplary research-based mathematics, science, technology and geography teacher education curricula that are integrated with content from NASA's mission. The awards will contribute to the participating states' efforts to increase the numbers and percentage of state-certified mathematics, science, or technology teachers employed in hard-to-staff elementary, middle, and secondary schools not normally served by NASA.

Pre-college Awards offer opportunities for MI's, in collaboration with NASA and local school districts, to provide informal educational opportunities that will enhance the numbers and percentage of students enrolled in mathematics and science college preparatory courses. As a result of participating in these awards, students will gain awareness of career opportunities in MSET fields, exposure to NASA's mission and scientific and technical personnel role models, and will enter college pursuing NASA-related career fields.

#### **Major MSE Research Results in the Past Year**

- Conducted an Expert Panel Evaluation of the Pre-college Achievement of Excellence (PACE) Program, which concluded that the contributions to an increase in the number of targeted students completing gateway classes were significant. Other recommendations included requiring baseline performance metrics from each PACE grantee
- The new PACE announcement for FY 2002 incorporates the reviewer's recommendations.
- Selection of five new Science Engineering Mathematics Aerospace Academy (SEMAA) sites competitively selected from the FY2001 NRA
- External evaluation of SEMAA validated the conceptual design and clarified appropriate outcome indicators of success.

#### **Program Plans for FY 2003**

- New NRA's for PACE
- New NRA's for SEMAA
- Continuation of multi-year awards for prior year grant awards selected under competitive NRA's